IMPLEMENTATION OF CASE-METHOD TRAINING IN MEDICAL EDUCATION

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ABSTRACT
The article is devoted to the problem of using the case-method as an interactive method of training in medical education. There are considered the history of origin, classification and types of case demonstration, stages of work with the case-study method, the problem of interactivity and the feasibility of using this method during the training of medical students. The case study teaching method is a highly adaptable style of teaching that involves problem-based learning and promotes the development of analytical skills. The results reported here suggest that case studies, regardless of the source, are significantly more effective than other methods of content delivery at increasing performance on examination questions

Introduction. One form of experimental learning is the case study. It may have many formats: the structured bedside case; patient management problems; extended case studies; clinical pathological conferences; computerized or video-disc case studies; and classroom electronic display of student responses. Following years of widespread use in business and medical education, the case study teaching method is becoming an increasingly common teaching strategy in science education. However, the current researches provide limited evidence that the use of published case studies effectively promotes the fulfilment of specific learning objectives integral to many medical courses. This article proves the hypothesis that case studies are more effective than classroom discussions and textbook reading at promoting learning in medicine, development of written and oral communication skills, and comprehension of the relevance of medical concepts to everyday life. Case studies produced by the teacher of a course are more effective at promoting learning than those made like tests with answers.

Main part. The case study teaching method is a highly adaptable style of teaching that involves problem-based learning and promotes the development of analytical skills [1]. Case studies develop higher levels of Bloom's taxonomy of cognitive learning with teaching in the format of a narrative accompanied by questions and activities that promote group discussion and solving of complex problems. Moving with growth of knowledge to analysis, evaluation, and application case studies evaluate interdisciplinary learning and can be used to highlight connections between specific academic topics and real-world medical issues [2,3]. For these reasons, case-based teaching has been widely used in business and medical education.

Although case studies were considered a novel method of science education just 10 years ago, the case study teaching method has gained popularity in recent years among an array of scientific disciplines such as anatomy, biology, chemistry, nursing, psychology and internal medicine [4,5,6]. Although there is now a substantive and growing body of literature describing how to develop and use case studies in science teaching, current research on the effectiveness of case study teaching at meeting specific learning objectives is of limited scope and depth [7].

Working in groups during completion of case studies significantly improves student perceptions of learning and may increase performance on assessment questions, and that can increase student engagement in case study activities. Use of case studies was also shown to improve students' ability to synthesize complex analytical questions about the real-world clinical situation associated with a scientific topic [8].

Additionally, it is reported that using case studies promotes critical thinking, learning, and participation among students, especially in terms of the ability to view an issue from multiple perspectives and to grasp the practical application of core course concepts [9].

Despite what is known about the effectiveness of case studies in science education of medical students, questions remain about the functionality of the case study teaching method at promoting specific learning objectives that are important to many undergraduate internal medicine courses. Although many teachers have produced case studies for use in their own classrooms, the production of novel case studies is time-consuming and requires skills that not all teachers have perfected.

Case studies also increased overall student perceptions of learning gains and perceptions of learning gains specifically related to written and oral communication skills and the ability to grasp connections between scientific topics and their real-world applications. The effectiveness of the case study teaching method at increasing academic performance was not correlated to whether the case study used was authored by the instructor of the course or by an unaffiliated instructor. These findings support increased use of published case studies in the teaching of a variety of medical concepts and learning objectives. How to use case studies will depend on the goals, as well as on the format, of different courses. If it is a large lecture course, for example, it might be used a case study to illustrate and enrich the lecture material.

Graduate students through the discussion of real cases, in the class at the same time as if personally on the scene, naturally into the role of doctors. At the same time feel the teacher's clinical thinking, we can feel the clinical thinking and experience the whole process of clinical analysis, thinking, reasoning and judgment, fully appreciate the fun and help of active participation, discovery, teamwork and interesting learning methods to bring happiness and efficiency. It is helpful to cultivate students' ability to analyze and solve problems independently. The case teaching method provides a more personalized, multi-channel access to knowledge for each student, in close connection with the actual learning theory to improve the comprehensive quality of students, which laid the foundation for the lifelong development of students.

The clinical case teaching method, encourage teachers to clinical practice in an extensive collection of various complex cases, and to collect the data of scientific arrangement, different case selection applies to clinical teaching needs; at the same time according to the change and development of constant renewal of medical theory and medical technology, timely update and necessary thus, teachers' teaching and scientific research level has been constantly improving. Teachers can guide students to analyze process to solve practical problems in clinical cases and continue to explore and improve clinical case teaching method, is a process of learning, the professional quality of teachers to be further improved.

Demonstration of cases is possible in printed, multimedia and video formats. Nowadays there are two classical schools case-study - Harvard (American) with the search for the only viable solution and Manchester (European), which involves a multivariate solution of the problem. American cases are larger in volume (20-25 pages of text, plus 8-10 pages of illustrations), European cases are 1.5-2 times shorter. European Case Clearing House are the leader in cases collection and distribution

By type of tasks, cases are divided into case-occasion, case-practice and case-situation. By teaching internal medicine, a case study can be used during each practical classes and lectures in order to illustrate a particular disease, to justify diagnostic methods. The case-practice gives students the opportunity to practice the acquired skills and is most often used where it is necessary to diagnose disease. In a case-situation, the most commonly asked question is: "Why has the situation got such development and how can the situation be corrected?" They use non-typical tasks where only the complications of the underlying disease are presented, and students make learning algorithm, decision-making research on a concrete example, in particular situation. Case situation, as a rule, takes a lot of time to get acquainted, therefore, in order to save time, it is advisable to have a preliminary training at home. These classical cases can be used for 6 hours of practical classes.

By volume and structure of information there are distinguished complex cases and mini cases. Complex cases are sufficiently voluminous (15 pages), contain a lot of detailed information, primary data, documents' sample, different method of investigations and this information may be insufficient and unstructured. The case may contain several variants of the solution, from which it is suggested to choose the best, but in some cases, all proposed solutions are not optimal, and the only way to successfully solve the case is to propose own decision. Mini-cases are practical situations that describe a problem in a concise form (1-4 pages). The amount of information is sufficient for a student who possesses the necessary knowledge and skills to make a well-founded decision.

Cases can also be classified according to the source of the initial information. Most cases are based on real companies and events. It is permissible to use "simulations" - a description of the situation in a fictional form. However, such a case, as a rule, contains little specific data and is not credible enough.

For all the variety of cases types, they all have a typical structure. Typically, a standard educational case includes: a situation - a case, a problem, a story from a real life; the context of the situation is the chronological, historical, context of the place, the peculiarities of the action or the participants of the situation; comment of the situation presented by the author, and questions or tasks for work with the case. Also, the case may contain applications. Concerning the technology of working with the case, it is necessary to understand and formulate the problem based on the interpretation of the situation. It is also necessary to identify the causes of this problem. Next, it is development various methods of action and solutions to the problem in this situation. Then a choice of the best solution (alternative) is chosen, based on an analysis of the positive and negative consequences of each, as well as on the analysis of the necessary resources for their implementation. The final step is to draw up a program of activities with an orientation towards the original goals and the reality of their implementation (with the definition of concrete steps and filling their content).

In a large class it might be considered breaking the class into small groups or pairs to discuss a relevant case. If class is a smaller, discussion-format course, it will been able to use more detailed and complex cases, to explore the perspectives introduced in the case in greater depth, and perhaps integrate other instructional strategies, such as role playing or debate.

While there are many variations in how case studies can be used, these six steps provide a general framework for how to lead a case-based discussion:

1. Give students ample time to read and think about the case. If the case is long, assign it as homework with a set of questions for students to consider

2. Introduce the case briefly and provide some guidelines for how to approach it. Clarify how students think about the case. Break down the steps how students should take in analyzing the case

3. Create groups and monitor them to make sure everyone is involved. Breaking the full class into smaller groups gives individual students more opportunities for participation and interaction. However, small groups can drift off track if you do not provide structure. Thus, it is a good idea to make the task of the group very concrete and clear. It can be also designation of roles within each group: for example, one individual might be charged with keeping the others on task and watching the time; a second individual's role might be to question the assumptions or interpretations of the group and probe for deeper analysis; a third individual's role might be to record the group's thoughts and report their decision to the class.

4. Have groups present their solutions/reasoning. Write their conclusions on the board so that to return to them in the discussion that follows.

5. Ask questions for clarification and to move discussion to another level. One of the challenges for a case-based discussion leader is to guide the discussion and probe for deeper analysis without over-directing.

6. Synthesize issues raised. Be sure to bring the various strands of the discussion back together at the end, so that students see what they have learned and take those lessons with them. The job of synthesizing need not necessarily fall to the instructor, however; one or more students can be given this task.

Some variations on this general method include having students do outside research (individually or in groups) to bring to bear on the case in question, and comparing the actual outcome of a real-life patients to the solutions generated in class.

There are some methods used in the case study, they are enumerated in table 1.

Table 1. Methods used in the case study

Method integrated in the case study	The characterization of methods' role in the case study
Modeling	Building a situation model
System Analysis	System representation and analysis of the situation
Mental Experiment	A way to gain knowledge about the situation through its mental transformation
Description method	Creating a description of the situation
Problem method	Representation of the problem underlying the situation
Classification Method	Creation of ordered lists of properties, parties that make up the situation
"Brainstorming"	Generation of ideas about the situation
Discussion	Exchange of views on the problem and ways to solve it

Example of using a case in internal medicine class, topic "Management of the patients with articular syndrome".

History. A 28-year-old man presents to the emergency department with an acutely painful and swollen right knee. The symptoms began 24 hours previously and have not responded to non-steroidal anti-inflammatory drugs (NSAIDs). He denies fever or constitutional upset. His medical history is unremarkable, except for a self-limiting but severe diarrhoeal illness 3 weeks previously.

The main syndromes are allocated, the differential diagnostic algorithm is made.

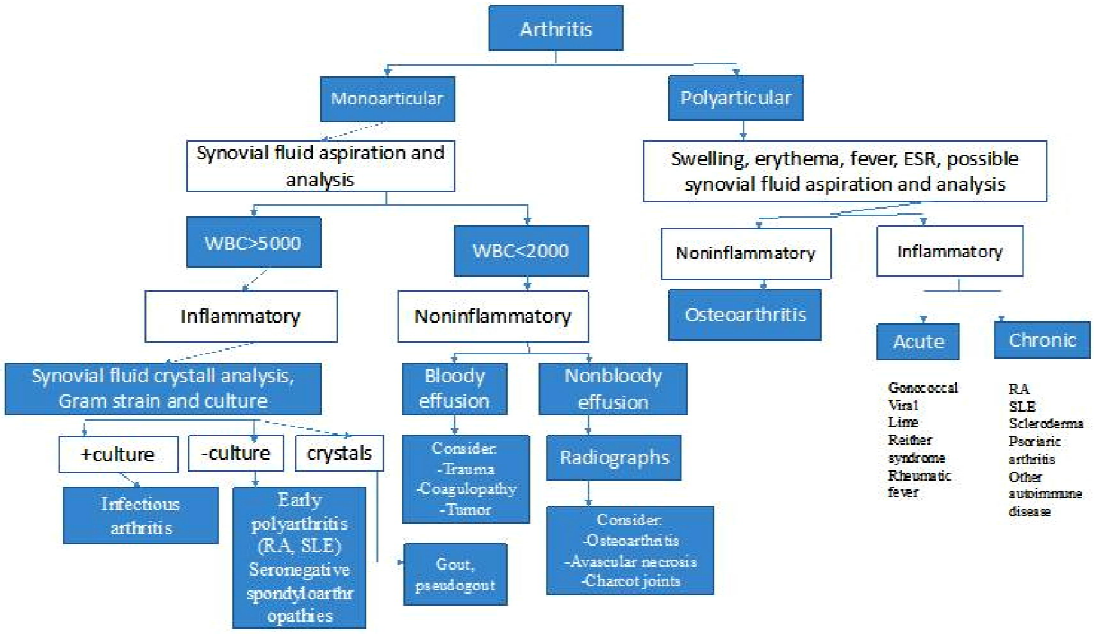

Fig. 1.

Preliminary diagnosis is issued. Add objective examination of the patient.

Examination. This young man appears well but uncomfortable. His right eye has an injected sclera and there is a moderate effusion in his right knee which is warm and displays reduced range of movement. He has a pustular rash on both heels. The remainder of the examination is normal.

Discuss diagnostic hypotheses, appoint additional methods of investigations for this patient. Then students get applications with CBC, biochemical data of blood, X-ray of joints, assess them and discuss. Offer to implement others. Teacher corrects the discussion. Eventually clinical diagnosis is made. Students discuss the treatment, suggest possible predictions, outcomes of the disease.

Summary. Case teaching method is the result of quality education reform. It plays an important role in the teaching of clinical medicine in universities. It is necessary to combine the current situation of medical reform. We should adjust the training objectives and training programs of clinical medical personnel, and establish a systematic and abundant case teaching resource library. At the same time, teachers should make corresponding changes in the concept of education, teaching methods, teaching methods, etc. Only in this way can we cultivate the practical and innovative medical talents with solid basic skills and strong working ability. The case-based approach was a successful educational modality for practicing with difficult case scenarios before engaging in similar scenarios with colleagues during actual clinical care.

However, it is a mistake to assume that cases can replace live communication with the patient, physical examination of the patient, lectures. Without mastering the theoretical material, the solution to a case is impossible. Of course, this pedagogical technology should be use in organic communication with others (teaching methods, including traditional ones, which form the students with mandatory normative knowledge

Conclusions.

1. The case method refers to non-gaming simulation interactive teaching methods, which enables to expand the boundaries of existing scientific and pedagogical paradigms, and promote the professional development of teachers and students.

2. The case-study method provides the assimilation of the theoretical positions of medicine and promotes the mastery of practical skills, the education of a creative approach to the

analysis of clinical laboratory and instrumental data, the professional development of the student.

3. Case method teaches the student the analysis and synthesis when working with information, work in a professional group and a collegial approach to problem solving.

4. The method allows to objectively evaluate knowledge, practical skills, professional skills of students, develops the clinical thinking of each individual student, based on his or her own intellectual potential.

5. Interactive methods are a means of enhancing studying. Students learn to be democratic, communicate with other people, think critically, and solve their clinical tasks.

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